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(FILE 'HOME' ENTERED AT 15:09:35 ON 10 AUG 2005)

FILE 'STNGUIDE' ENTERED AT 15:09:40 ON 10 AUG 2005

FILE 'CAPLUS' ENTERED AT 15:09:51 ON 10 AUG 2005

L1 28745 S HYDROXYALKYL?
L2 71612 S L1 AND "(METH)ACRYLIC" OR METHACRYLIC
L3 251 S L2 AND "ALKYLENE OXIDE"
L4 7 S L3 AND DISTILL?

=> d bib abs 1-7

L4 ANSWER 1 OF 7 CAPLUS COPYRIGHT 2005 ACS on STN
AN 2004:120625 CAPLUS
DN 140:181961
TI Catalytic esterification process for the production of
hydroxyalkyl (meth)acrylates from (meth)**acrylic**
acids and epoxides
IN Takaki, Hiroyuki; Ishida, Tokumasa; Uemura, Masahiro
PA Nippon Shokubai Co., Ltd., Japan
SO U.S. Pat. Appl. Publ., 14 pp.
CODEN: USXXCO
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2004030180	A1	20040212	US 2003-633139	20030801
	JP 2004075559	A2	20040311	JP 2002-234630	20020812
	EP 1389610	A1	20040218	EP 2003-17427	20030801
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
	CN 1483718	A	20040324	CN 2003-127768	20030812
PRAI	JP 2002-234630	A	20020812		

AB **Hydroxyalkyl** (meth)acrylates (e.g., hydroxyethyl acrylate) are prepared in a process in which: the diffusion of harmful substances due to disposal of catalysts can be reduced; and also the amount of the catalyst as used can be greatly saved in the entire production process. This process comprises carrying out an esterification reaction between (meth)**acrylic** acid and an **alkylene oxide** (e.g., ethylene oxide) in the presence of a catalyst in order to produce the **hydroxyalkyl** (meth)acrylate; with the production process being characterized by further comprising the step of recovering the catalyst which has been used for the reaction.

L4 ANSWER 2 OF 7 CAPLUS COPYRIGHT 2005 ACS on STN
AN 2002:522685 CAPLUS
DN 137:79371
TI Production process for hydroxylalkyl (meth)acrylate via reaction of (
meth)acrylic acid and **alkylene oxide**
IN Matsumoto, Hajime; Kajihara, Tetsuya; Yoneda, Yukihiro
PA Japan
SO U.S. Pat. Appl. Publ., 6 pp.
CODEN: USXXCO
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2002091283	A1	20020711	US 2001-3044	20011206

JP 2002275126 A2 20020925 JP 2001-392416 20011225
PRAI JP 2001-2821 A 20010110

AB Title process comprises the step of (I) carrying out a reaction between (meth)acrylic acid and an alkylene oxide in order to produce the hydroxyalkyl (meth)acrylate, (II) recovering the unreacted (meth)acrylic acid by distillation of the resultant reaction liquid; and (III) recycling the recovered unreacted (meth)acrylic acid as a raw material for the reaction. Thus, hydroxyethyl acrylate was prepared by reacting acrylic acid containing hydroquinone monomethyl ether with ethylene oxide in the presence of Diaion PA 316 at 70° for 4.1 h under 4,200 Pa.

L4 ANSWER 3 OF 7 CAPLUS COPYRIGHT 2005 ACS on STN

AN 2001:261093 CAPLUS

DN 134:281558

TI Purification process for hydroxyalkyl (meth)acrylate

IN Yoneda, Yukihiro; Shibusawa, Fumio; Shingai, Yasuhiro; Ueoka, Masatoshi

PA Nippon Shokubai Co., Ltd., Japan

SO Eur. Pat. Appl., 10 pp.

CODEN: EPXXDW

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1090904	A2	20010411	EP 2000-121755	20001005
	EP 1090904	A3	20030129		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	JP 2001106654	A2	20010417	JP 1999-286974	19991007
	JP 3592970	B2	20041124		
	US 6380424	B1	20020430	US 2000-664967	20000916
	CN 1293185	A	20010502	CN 2000-129086	20000929
PRAI	JP 1999-286974	A	19991007		

AB In a purification process for hydroxyalkyl (meth)acrylate, that reduces the formation of byproducts such as a diester and a dimer of acrylic acid in the distillation process to ensure the purity of hydroxyalkyl (meth)acrylate and can operate stably without causing troubles such as polymerization, a hydroxyalkyl (meth)acrylate which is obtained by reacting (meth)acrylic acid and alkylene oxide in the presence of a catalyst and removing unreacted alkylene oxide and/or (meth)acrylic acid in a reaction solution after the reaction a distillation apparatus having a portion of a vacant column and a thin-film evaporation apparatus are used at the same time.

L4 ANSWER 4 OF 7 CAPLUS COPYRIGHT 2005 ACS on STN

AN 1999:206269 CAPLUS

DN 130:269555

TI Flow improvers for fuel oils and the fuel oil compositions

IN Sawamura, Takashi; Nishioka, Shinya; Fukumoto, Masahiro; Ishizaki, Koji

PA Nippon Oil and Fats Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 12 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 11080757	A2	19990326	JP 1997-248185	19970912
PRAI	JP 1997-248185		19970912		

AB Flow improvers for fuel oil compns. contain (A) amide compound-alkylene oxide reaction products 1-99, and (B) (1) reaction products of primary amines and copolymers of unsatd. polyvalent carboxylic acids or their anhydrides with α -olefins and/or (2) polymers having number-average mol. weight of 1000-100,000 and obtained from specific monomers 1-99 weight%. The flow improvers are used at 0.0001-0.1 weight% concentration for middle **distillate** oils and/or their mixts. with residual oils.

L4 ANSWER 5 OF 7 CAPLUS COPYRIGHT 2005 ACS on STN

AN 1988:222261 CAPLUS

DN 108:222261

TI Manufacture of 2-hydroxyalkyl (meth)acrylates using nitrate polymerization inhibitors

IN Kanbara, Yoshihiko; Asano, Shiro; Isozaki, Wataru; Asao, Koichi; Fukada, Isao

PA Mitsui Toatsu Chemicals, Inc., Japan

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 63027457	A2	19880205	JP 1986-169676	19860721
	JP 07064788	B4	19950712		
PRAI	JP 1986-169676		19860721		

AB In the manufacture of 2-hydroxyalkyl (meth)acrylates in stainless steel apparatus by treating (meth)acrylic acid with alkylene oxides and catalysts, then distilling, polymerization is inhibited by

the addition of HNO₃ or nitrate salts. Thus, 661 g **methacrylic** acid was treated with 351 g ethylene oxide in the presence of CrCl₃ and NaNO₃ in an SUS-304 autoclave at 80-90°, then 720 g 2-hydroxyethyl methacrylate (I) was distilled at 90-95° and 5-6 mm Hg over 4 h using an SUS-304 condenser and tubing. No polymer was observed in the product or the high-boiling distillation residue. Only 420 g I was obtained, due to polymerization in the autoclave, when phenothiazine was used instead of NaNO₃, even though phenothiazine effectively inhibited polymerization during distillation in a glass apparatus

L4 ANSWER 6 OF 7 CAPLUS COPYRIGHT 2005 ACS on STN

AN 1986:479510 CAPLUS

DN 105:79510

TI Distillation of 2-hydroxalkyl (meth)acrylate

IN Kanbara, Yoshihiko

PA Mitsui Toatsu Chemicals, Inc., Japan

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 61027944	A2	19860207	JP 1984-146788	19840717
PRAI	JP 1984-146788		19840717		

AB Reaction mixture containing mainly 2-hydroxyethyl (meth)acrylate from the esterification of (meth)acrylic acid with **alkylene oxide** in the presence of a trivalent Cr compound could be purified by distillation without causing polymerization of the distillation bottom when the reaction mixture had λ_{\max} (in the >500 nm region in visible

absorption spectrum) >575 nm. Thus, a mixture of 30.0 kg **methacrylic** acid, 186 g CrCl₃.6H₂O, and 150 g phenothiazine at 80° (inner pressure 1.5 atm) was fed over 5 with 15.9 kg ethylene oxide and heated at 90° for 2 h. The reaction mixture had λ_{max} 582 nm, residual **methacrylic** acid content 0.3%, residual ethylene oxide content 200 ppm, and ethylene oxide/Cr molar ratio 0.29. This reaction mixture was further fed with 80 g ethylene oxide and aged at 90° for 1 h to give a reaction mixture with λ_{max} 579 nm. A portion of this product was further heated for 1 h to give a reaction mixture with λ_{max} 574 nm. From the product with λ_{max} 579 nm, 910 g 2-hydroxyethyl methacrylate could be distilled without causing polymerization of the distillation bottom, while the other product, after distillation of 75 g of 2-hydroxyethyl methacrylate, became thick and could not be distilled

L4 ANSWER 7 OF 7 CAPLUS COPYRIGHT 2005 ACS on STN

AN 1976:180859 CAPLUS

DN 84:180859

TI **Hydroxyalkyl** (meth)acrylates

IN Yoshida, Sadao; Daigo, Hiromiki; Matsumoto, Shoichi; Shimizu, Noboru

PA Nippon Shokubai Kagaku Kogyo Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 51008215	A2	19760123	JP 1974-79072	19740712
	JP 57000300	B4	19820106		
PRAI	JP 1974-79072	A	19740712		

AB **Hydroxyalkyl** (meth)acrylates were prepared by treating (**meth**)**acrylic** acid with alkylene oxides in the presence of (a) Na₂Cr₂O₇ [10588-01-9] or K₂Cr₂O₇ [7778-50-9], (b) phenothiazines, and (c) Cu dialkyldithiocarbamates. Thus, acrylic acid [79-10-7] 432, phenothiazine [92-84-2] 0.4, copper dibutyldithiocarbamate [13927-71-4] 0.3, and Na₂Cr₂O₇ 1.7 g was treated with 241 g/hr ethylene oxide [75-21-8] at 70-5° for 1.5 hr, heated at 60° for 1 hr, and **distilled** to give 96% 2-hydroxyethyl acrylate [818-61-1] of 99% purity. Storage at room temperature for 6 months caused no discoloration. Similarly prepared were 2-hydroxypropyl acrylate [999-61-1] and 2-hydroxyethyl methacrylate [868-77-9].

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(FILE 'HOME' ENTERED AT 16:19:39 ON 10 AUG 2005)

FILE 'STNGUIDE' ENTERED AT 16:19:43 ON 10 AUG 2005

L1 0 S HYDROXYALK?

FILE 'CAPLUS' ENTERED AT 16:19:58 ON 10 AUG 2005

L2 32964 S HYDROXYALK?

L3 1343 S L2 AND ("(METH)ACRYLIC" OR METHACRYLIC)

L4 61 S L3 AND ("ALKYL OXIDE" OR "ALKYLENE OXIDE")

L5 6 S L4 AND DISTILL?

L6 2 S L4 AND RECYC?

L7 7 S L5 OR L6

=> d bib abs 1-7

L7 ANSWER 1 OF 7 CAPLUS COPYRIGHT 2005 ACS on STN

AN 2004:120625 CAPLUS

DN 140:181961

TI Catalytic esterification process for the production of
hydroxyalkyl (meth)acrylates from (meth)acrylic
acids and epoxides

IN Takaki, Hiroyuki; Ishida, Tokumasa; Uemura, Masahiro

PA Nippon Shokubai Co., Ltd., Japan

SO U.S. Pat. Appl. Publ., 14 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2004030180	A1	20040212	US 2003-633139	20030801
	JP 2004075559	A2	20040311	JP 2002-234630	20020812
	EP 1389610	A1	20040218	EP 2003-17427	20030801
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
	CN 1483718	A	20040324	CN 2003-127768	20030812
PRAI	JP 2002-234630	A	20020812		

AB **Hydroxyalkyl** (meth)acrylates (e.g., hydroxyethyl acrylate) are prepared in a process in which: the diffusion of harmful substances due to disposal of catalysts can be reduced; and also the amount of the catalyst as used can be greatly saved in the entire production process. This process comprises carrying out an esterification reaction between (meth)
acrylic acid and an **alkylene oxide** (e.g., ethylene oxide) in the presence of a catalyst in order to produce the **hydroxyalkyl** (meth)acrylate; with the production process being characterized by further comprising the step of recovering the catalyst which has been used for the reaction.

L7 ANSWER 2 OF 7 CAPLUS COPYRIGHT 2005 ACS on STN

AN 2002:522685 CAPLUS

DN 137:79371

TI Production process for hydroxylalkyl (meth)acrylate via reaction of (
meth)acrylic acid and **alkylene oxide**

IN Matsumoto, Hajime; Kajihara, Tetsuya; Yoneda, Yukihiro

PA Japan

SO U.S. Pat. Appl. Publ., 6 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2002091283	A1	20020711	US 2001-3044	20011206
	JP 2002275126	A2	20020925	JP 2001-392416	20011225
PRAI	JP 2001-2821	A	20010110		

AB Title process comprises the step of (I) carrying out a reaction between (meth)acrylic acid and an alkylene oxide in order to produce the hydroxyalkyl (meth)acrylate, (II) recovering the unreacted (meth)acrylic acid by distillation of the resultant reaction liquid; and (III) recycling the recovered unreacted (meth)acrylic acid as a raw material for the reaction. Thus, hydroxyethyl acrylate was prepared by reacting acrylic acid containing hydroquinone monomethyl ether with ethylene oxide in the presence of Diaion PA 316 at 70° for 4.1 h under 4,200 Pa.

L7 ANSWER 3 OF 7 CAPLUS COPYRIGHT 2005 ACS on STN

AN 2002:256830 CAPLUS

DN 136:279842

TI Process for producing hydroxyalkyl (meth)acrylate from (meth)acrylic acid and alkylene oxide

IN Matsumoto, Hajime; Ishida, Tokumasa; Yoneda, Yukihiro

PA Nippon Shokubai Co., Ltd., Japan

SO U.S. Pat. Appl. Publ., 6 pp.

CODEN: USXXCO

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2002040125	A1	20020404	US 2001-965699	20010926
	US 6534625	B2	20030318		
	JP 2002114740	A2	20020416	JP 2000-300771	20000929
PRAI	JP 2000-300771	A	20000929		

AB The process for producing a hydroxyalkyl (meth)acrylate providing an economically and efficiently recovering and recycling the unreacted residue of the alkylene oxide, comprises the steps of, carrying out a reaction between (meth)acrylic acid and an alkylene oxide; stripping the unreacted residue of the alkylene oxide from the resultant reaction liquid; and causing a solvent to absorb the stripped alkylene oxide; wherein: water is used as the absorbing solvent; and an absorbing liquid resultant from the absorption of the unreacted residue of the alkylene oxide is used for production of an alkylene glycol.

L7 ANSWER 4 OF 7 CAPLUS COPYRIGHT 2005 ACS on STN

AN 2001:261093 CAPLUS

DN 134:281558

TI Purification process for hydroxyalkyl (meth)acrylate

IN Yoneda, Yukihiro; Shibusawa, Fumio; Shingai, Yasuhiro; Ueoka, Masatoshi

PA Nippon Shokubai Co., Ltd., Japan

SO Eur. Pat. Appl., 10 pp.

CODEN: EPXXDW

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1090904	A2	20010411	EP 2000-121755	20001005
	EP 1090904	A3	20030129		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	JP 2001106654	A2	20010417	JP 1999-286974	19991007

JP 3592970	B2	20041124		
US 6380424	B1	20020430	US 2000-664967	20000916
CN 1293185	A	20010502	CN 2000-129086	20000929
PRAI JP 1999-286974	A	19991007		

AB In a purification process for **hydroxyalkyl** (meth)acrylate, that reduces the formation of byproducts such as a diester and a dimer of acrylic acid in the distillation process to ensure the purity of **hydroxyalkyl** (meth)acrylate and can operate stably without causing troubles such as polymerization, a **hydroxyalkyl** (meth)acrylate which is obtained by reacting (meth)acrylic acid and **alkylene oxide** in the presence of a catalyst and removing unreacted **alkylene oxide** and/or (meth)acrylic acid in a reaction solution after the reaction a distillation apparatus having a portion of a vacant column and a thin-film evaporation apparatus are used at the same time.

L7 ANSWER 5 OF 7 CAPLUS COPYRIGHT 2005 ACS on STN

AN 1988:222261 CAPLUS

DN 108:222261

TI Manufacture of 2-**hydroxyalkyl** (meth)acrylates using nitrate polymerization inhibitors

IN Kanbara, Yoshihiko; Asano, Shiro; Isozaki, Wataru; Asao, Koichi; Fukada, Isao

PA Mitsui Toatsu Chemicals, Inc., Japan

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 63027457	A2	19880205	JP 1986-169676	19860721
	JP 07064788	B4	19950712		
PRAI	JP 1986-169676		19860721		

AB In the manufacture of 2-**hydroxyalkyl** (meth)acrylates in stainless steel apparatus by treating (meth)acrylic acid with alkylene oxides and catalysts, then distilling, polymerization is inhibited by the addition of HNO₃ or nitrate salts. Thus, 661 g **methacrylic acid** was treated with 351 g ethylene oxide in the presence of CrCl₃ and NaNO₃ in an SUS-304 autoclave at 80-90°, then 720 g 2-hydroxyethyl methacrylate (I) was distilled at 90-95° and 5-6 mm Hg over 4 h using an SUS-304 condenser and tubing. No polymer was observed in the product or the high-boiling distillation residue. Only 420 g I was obtained, due to polymerization in the autoclave, when phenothiazine was used instead of NaNO₃, even though phenothiazine effectively inhibited polymerization during distillation in a glass apparatus

L7 ANSWER 6 OF 7 CAPLUS COPYRIGHT 2005 ACS on STN

AN 1986:479510 CAPLUS

DN 105:79510

TI **Distillation** of 2-hydroxalkyl (meth)acrylate

IN Kanbara, Yoshihiko

PA Mitsui Toatsu Chemicals, Inc., Japan

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI JP 61027944 A2 19860207 JP 1984-146788 19840717
PRAI JP 1984-146788 19840717

AB Reaction mixture containing mainly 2-hydroxyethyl (meth)acrylate from the esterification of (meth)acrylic acid with alkylene oxide in the presence of a trivalent Cr compound could be purified by distillation without causing polymerization of the distillation bottom when the reaction mixture had λ_{\max} (in the >500 nm region in visible absorption spectrum) >575 nm. Thus, a mixture of 30.0 kg methacrylic acid, 186 g $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$, and 150 g phenothiazine at 80° (inner pressure 1.5 atm) was fed over 5 with 15.9 kg ethylene oxide and heated at 90° for 2 h. The reaction mixture had λ_{\max} 582 nm, residual methacrylic acid content 0.3%, residual ethylene oxide content 200 ppm, and ethylene oxide/Cr molar ratio 0.29. This reaction mixture was further fed with 80 g ethylene oxide and aged at 90° for 1 h to give a reaction mixture with λ_{\max} 579 nm. A portion of this product was further heated for 1 h to give a reaction mixture with λ_{\max} 574 nm. From the product with λ_{\max} 579 nm, 910 g 2-hydroxyethyl methacrylate could be distilled without causing polymerization of the distillation bottom, while the other product, after distillation of 75 g of 2-hydroxyethyl methacrylate, became thick and could not be distilled

L7 ANSWER 7 OF 7 CAPLUS COPYRIGHT 2005 ACS on STN
AN 1976:180859 CAPLUS
DN 84:180859
TI Hydroxyalkyl (meth)acrylates
IN Yoshida, Sadao; Daigo, Hiromiki; Matsumoto, Shoichi; Shimizu, Noboru
PA Nippon Shokubai Kagaku Kogyo Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 51008215	A2	19760123	JP 1974-79072	19740712
	JP 57000300	B4	19820106		
PRAI	JP 1974-79072	A	19740712		

AB Hydroxyalkyl (meth)acrylates were prepared by treating (meth)acrylic acid with alkylene oxides in the presence of (a) $\text{Na}_2\text{Cr}_2\text{O}_7$ [10588-01-9] or $\text{K}_2\text{Cr}_2\text{O}_7$ [7778-50-9], (b) phenothiazines, and (c) Cu dialkyldithiocarbamates. Thus, acrylic acid [79-10-7] 432, phenothiazine [92-84-2] 0.4, copper dibutyldithiocarbamate [13927-71-4] 0.3, and $\text{Na}_2\text{Cr}_2\text{O}_7$ 1.7 g was treated with 241 g/hr ethylene oxide [75-21-8] at 70-5° for 1.5 hr, heated at 60° for 1 hr, and distilled to give 96% 2-hydroxyethyl acrylate [818-61-1] of 99% purity. Storage at room temperature for 6 months caused no discoloration. Similarly prepared were 2-hydroxypropyl acrylate [999-61-1] and 2-hydroxyethyl methacrylate [868-77-9].

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